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THE JOURNAL OF PHILOSOPHY

PSYCHOLOGY

AND

SCIENTIFIC METHODS

VOL. XIV. NO. 3: FEBRUARY 1, 1917

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PUBLISHED FORTNIGHTLY

THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

All communications to the Editors should be addressed to PROFESSOR FREDERICK J. E. WOODBRIDGE, or Professor WENDELL T. BUSH, Columbia University, New York City.

Subscriptions and advertisements should be sent to THE JOURNAL OF PHILOSOPHY, Sub-Station 84, New York City. The annual subscription price (twenty-six numbers) is $3.00 and the charge for single numbers is 15 cents. Advertising rates will be forwarded on application.

The Journal of Philosophy, Psychology, and Scientific Methods is owned and published by Frederick J. E. Woodbridge and Wendell T. Bush, at Lancaster, Pa.

Entered as second class matter, January 19, 1904, at the Post Office at Lancaster, Pa., under Act of Congress of March 3, 1879.

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VOL. XIV, No. 3. FEBRUARY 1, 1917

THE JOURNAL OF PHILOSOPHY, PSYCHOLOGY AND SCIENTIFIC METHODS

MATTER AND ENERGY

THE concepts of matter and energy are the results of scientific analysis of the physical world and the most fundamental concepts in terms of which the events of that world can be construed. In the philosophic study of such concepts the primary need is a close inspection of the realities that they denote, for all concepts, if they are not sterile, must denote some sort of reality, and it is the nature and value of this reality that primarily concerns us as metaphysicians. Our materials are, then, the researches of the scientists, and these are to be understood as closely as possible to the way in which the scientist understands them, that is, with the least possible corruption through philosophic presupposition. If our results are in opposition to utterances by scientists, they will not be opposed to the scientists' facts and practise, but only to the somewhat hasty and often antiquated philosophic points of view which men, most painstaking in other matters, so often inconsiderately interject into their work.

The history of the atomic concept has been too long and complex to receive detailed consideration here, for atoms have been imagined since the dawn of history. In the Soutras of India, probably before 1200 B.C., Kanada defines substance as "that in which qualities abide and in which action takes place. Earth, water, light, air, ether, time, place, soul, mind, such are the substances." To the first five of these is attributed atomic structure. The atoms are simple and indivisible else "there would be no difference of magnitude between a mustard seed and a mountain, a gnat and an elephant, each alike containing an infinity of particles."[1] Probably independently of this, atomic theories arose early in Greek thought and since, as Bacon wrote, "Men cease not from abstracting nature till they come to potential and uninformed matter, nor on the other hand from dissecting nature till they reach the atom."[2] But we are now primarily concerned with the use of the concept since the epoch-making work of Dalton,

[1] Freund, *The Study of Chemical Composition*, pp. 229–30.

[2] *Novum Organum.*

for it was Dalton who first transformed it into a valuable instrument for experimental science.

The primitive suggestion, as it appears in Kanada and even more clearly with the pre-Socratics, is the need of finding something permanent and abiding so that, with the aid of varying relations, change can be described. The fact that practical needs compel us to treat realities as in some way the same, although changed, is the cue to the structure of logical thinking even more than the spectacle of the Heavens so ardently apostrophized by Poincaré,[3] for through it, the distinction of terms and relations becomes manifest, and from the application of this distinction to the analysis of the physical world, some form of the atomic conception must have arisen even without the model of the starry heavens above, and through it also, the development of atomic theories is controlled with a concreteness that Poincaré's more poetically inspiring model could never have compelled.

Dalton's achievement is that of giving an empirical character to the terms and relations suggested by atomic analysis. To make this evident it is only necessary to review the specific points of his hypothesis. He writes (1) "I should apprehend there are a considerable number of what may properly be called elementary principles (atoms), which can never be metamorphosed one into another by any power we can control. We ought, however, to avail ourselves of every means to reduce the number of bodies or principles of this appearance as much as possible; and, after all, we may not know what elements are absolutely undecomposable and what are refractory, because we do not apply the proper means for their reduction." In other words, there are different kinds of atoms distinguishable by their properties and actions. (2) "Matter is not infinitely divisible." This seems to have been a logical postulate for Dalton, but has proved itself experimentally valid within the field of chemical process as he understood it. With it is associated the next principle, (3) "No new creation or destruction of matter is within the reach of chemical agency. We might as well attempt to introduce a new planet into the solar system, or to annihilate one already in existence, as to create or destroy a particle of hydrogen." And so far we are merely in line with the current historical form of atomism of his day, but the remaining assertions give concrete additional properties that are sufficient to transform the status of the whole conception. (4) The atoms have characteristic weights, (5) they combine in simple numbers, and (6, 7) their relative weights and the complexities of compound atoms (molecules) and their rules of chemical synthesis may be determined. The atomic theory, then,

[3] *The Value of Science*, Ch. VI.

has come to give us a set of empirically determined terms and relations with the marked advantage over the old that by them observed changes can be predicted and controlled and empirical verification, at least by indirect observation, found.

To-day the atomic analysis of matter is being transcended, yet, with the exception of certain determinations of specific characteristics, the hypothesis of Dalton still stands. What has happened is that a closer contact through experiment with the behavior of material substance has indicated that the atom represents only a stage of analysis and that, for the study of certain processes such as phosphorescence, light, radio-activity, electric and magnetic phenomena, changes must be described that can not be expressed in terms of known atoms, but demand a more basic element out of which atoms may be constituted, and the electron has come to fill the place. Whether in turn this must give way to something still more minute is a question for the future of science to show, but at any rate, the type of analysis of the physical world will remain the same in so far as such analysis is retained.

The real existence of atoms and of electrons has been both denied and affirmed. Experimental evidence to-day seems to favor the affirmation, but the problem is not quite as simple as some of the experimentalists would have us believe. There is a delusive clearness about the alternative "real entities" or "physical postulates" and "hypothetical entities." We shall have to return to this problem again, but it can best be done when we have made a preliminary examination of that other concept so closely associated with that of matter, the concept of energy, and this concept will now concern us.

Energy is currently defined as the capacity to perform work, but, as far as observation is concerned, Hume might have pointed out that we find merely a means of correlating change in one part of our experience with changes observed elsewhere. If it asserted that it takes a certain amount of energy to raise a given object to a certain height, it is meant that there is an observable descriptive correlation between the mass and velocity of an associated body that is said to cause the effect and the effect produced. The simplest observable exhibition of energy is in the communication of motion by contact of a moving body with something that moves after the contact. For the ancients this movement was an inherent property of material substance or of some specific substance, such as the Nous of Anaxagoras, and this inherent property was "communicated" from one body to others. The term force is roughly used to cover the situation, and still remains popularly the name of a property by virtue of which changes are produced. But the term force is too general to cover the facts as they appear under detailed analysis

and in modern science it becomes necessary to find a term to express in quantitative form the persistent correlation observable between the kind and amount of movement of the first moving body and that of the body to which movement has been "communicated," and for this purpose, early in the nineteenth century, Young introduced the term energy.

But the same study that leads to quantitative correlation, also brings out certain other features of the propagation of motion. Thus the motion of mass, a cannon ball for example, may result primarily in a motion of molecules when the ball hits an impenetrable armor plate, that is, in heat, but nevertheless, there is a definite qualitative relation between this heat and the mass and velocity of the moving ball. And besides these direct contact cases, there are a large number of cases where the propagation of change from one to another takes place when the bodies appear to be at a distance, as in gravitation, illumination, chemical affinity, and the like. Probably, because it is the way we work with our bodies, we accept contact effectiveness as needing no explanation, but seek hypotheses to cover the latter sort of propagation. However, the latter is no more mysterious than the former. It is merely less close to human behavior. Why should a billiard ball roll when struck by another, or an object move because it is pushed? To attempt a scientific answer in terms of solidity, resistance, elasticity, and the like has no more value than the explanation of the dormitive powers of opium through its soporific virtue. The only real answer is that physical reality behaves that way and at that point all our questionings must cease except in so far as we can attain description of our facts in increasingly general terms and discover an ever growing number of relations and correlations between them.

But the case of what appears naïvely as action at a distance demands further analysis. As far as unaided human observation is concerned, there are many instances where a change in one part of reality involves changes elsewhere. Closer observation shows that in many such cases, the introduction of something between the "cause" and its "effect" results in the propagating change being intercepted by the inserted body and taking place in it instead of at the point where it has originally appeared. The most simple example is the insertion of a screen between a source of light and the illuminated object, where the object loses its illumination and the screen receives it. We are then led to assume that the propagation of this change is really continuous between the two bodies and this hypothesis has served as a basis for a vast amount of scientific discovery. We are also led to assume the existence of some medium of which the propagated change is a mode of motion and the result is

the ether concept, of which at present the sole characteristics are those introduced to satisfy a formula accounting for a connection of certain things whereby changes in the one involve changes in the other also.

The most striking feature of all scientific references to energy is the apparent necessity of conceiving it always as a case of something in motion, mass, molecule, atom, electron, or ether. The holding in check or distorting of certain normal motions through an outside agency or opposed tendency to motion, as when a spring is held wound, is what is known as potential energy, and the capacity to produce change while regaining or continuing normal motions, as when the watch is running, is the same energy in kinetic form. But it is always expressible in terms of something in motion or tending to move, and it is also noteworthy that the propagation of energy, whenever possible, is conceived as a contact push, either directly or by a medium. In a few cases pulls are also suggested though, at last analysis, these often reduce to some form of ether disturbance where the pull is like the suction behind a vessel moving through the water and really reducible to pushes. It is interesting also that the best of the tentative explanations of that most mysterious of all physical processes, gravitation, although hardly reaching the value of fruitful scientific hypothesis, have also been made in terms of push.

At last analysis, then, we think of energy in terms of pulls and pushes, but except as a description of immediate experience, nobody knows what a pull or a push is. There is a tendency to feel the push as the more ultimate concept because experienced pulls always involve the presence of some kind of material connection, like a string, through which the pull becomes effective and in the case of theoretically detached objects, like atoms, molecules, and electrons, it is not so clear what takes the place of the string unless we introduce some conception such as that of ether strain of which the concrete meaning seems to be wholly undetermined by the chemists and physicists except in so far as to account for the phenomena they have in mind, that is, it is an entity defined purely hypothetically. The analogical suggestion is often that of currents in a liquid and this, of course, transforms the idea into that of push.

But if we accept the push concept as the ultimate are we then provided with something more intelligible? I think not. That the cue pushes the billiard ball is at best only a way of describing what takes place when a certain contact between a moving and a stationary object is made. It is again a case of a description of an immediate experience. Why should an object move when pushed? To answer in terms of its resistance to penetration does not carry us any farther

toward an understanding of fact, for it is only to move circularly in terms of concepts already derived from description of experience alone.

This comment, however, is not meant to suggest an unknowable back of scientific reality as was done by Herbert Spencer, for against Spencer, Royce is quite right in asserting that the only things that are unknowable in an absolute sense are the answers to absurd or self-contradictory questions. Our only aim is to emphasize the functional and empirical basis of all knowledge. We must begin with a description of certain observed facts, whether we begin with a high and complex order of phenomena, as in studying the problems of the social sciences, or with the most minute phenomena that enter into the ultimate analysis of the physicist and chemist. And if we begin in this fashion, the only meaning of knowledge is to pick out relations discoverable between more complex phenomena that can be construed as complications of the elementary observated facts.

The facts that give rise to our concept of energy seem to indicate that change found in any part of the universe spreads to other parts in a fashion capable of definite qualitative and quantitative description. The principle of the conservation of energy is merely the universalizing of this generalization, an assertion of the effective unity of the whole. The principle, as Poincaré asserts, can not be definitely proved, but it is nevertheless a successful generalization of experience, on an equal status with any other empirical law. In other words we have in energy the physicists' expression of the contactual unity of the physical world, but to see the full consequences of this we must return to the analysis of matter with which we commenced.

The scientific world presents itself to us as a collection of elements, mass, molecule, atom, electron, which represent stopping-points in our efforts to analyze, and energies, or concrete formulations of the results to be expected elsewhere, as to kind and quantity, when a specific change takes place in any of these elements or in any group of them. But we must not falsely assume that we have here constituent elements and a world built up through different arrangements and combinations of them. Let us return to our concepts and see them with respect to the realities they denote.

First consider the atom with its affinities and valency. If we ask what it is, we are told that we have a collection of electrons having certain specific motions and, if our informant were sufficiently wise, he might tell us by what laws or general description of behavior, all its energies and substance properties result from the particular number of electrons, arranged in the particular way that make up its structure. The atom with its properties, has ceased to be a substance, but is an integrated group of substances, electrons, and their energies.

These electron energies have become part of the substance of the atom and the atom is really an entity in about the same sense that congress is an entity. Indeed, in so far as any "element" shows complexity of behavior, it is probable that it can be analyzed into a complex and it is highly doubtful whether our electron is as simple as now appears.

The historic problem of an ultimate element is the one that will suggest itself to most philosophers here, but to one who has comprehended the foregoing, the classic antinomy between the finite and infinite divisibility of matter will not be the starting-point. Resting-points in analysis are determined by the needs of human action, and what we are satisfied to call elements depend on the nature of reality as limiting and making possible our activities. They may vary as we acquire new ends, more elaborate technique, and closer observation. But reality, as such, is not divided by our analysis, but merely thrown into useful perspectives. If one were to attempt an absolute metaphysical assertion, it would be necessary to hold that reality is indivisible. Man may slice matter at his pleasure, but the connection of its parts that can be attributed to ether, gravitation, etc., are never severed or in any way interrupted, whatever significance the division may retain for human action.

If we ask, however, if our analysis must proceed infinitely, it can be replied that any analysis that fulfils the function for which analyses come into being will represent a finite resting place. The mathematical infinite and the transfinite are finite resting-points of analysis. The assumption that it would require "infinite complexity to grasp the real" that sentimental philosophy is wont to make, is merely based on the fact of the formal possibility that there should always be a purpose or attitude demanding a more complex analysis than any given finite analysis, but without empirical fact, it is idle to speculate on the possibility of such a situation. The concept of levels suggests, however, an ultimate pluralism in the sense that different needs can be fulfilled by different types of analysis, for, though scientific needs might be monistically satisfied, the entities built up of lesser entities in the monistic system have, with respect to us, wholly new uses that lend themselves to new types of analysis. An act of theft may have a psychological, biological, chemical, or physical explanation, but it invokes a response from us which is not a response of any of these types, but to the integration of processes that make the theft a new and unique sort of fact in our environment. Instead then of asserting the infinite complexity of the real, we can assert merely that any empirical analysis of reality will be finite, and that, due to the complex possibilities of human behavior, an indefinite number of such analyses may be made and that they are

not necessarily reducible to a single analytic system. They are not contradictory to each other, but rather like divisions of the same material in accordance with different *fundamenta divisionis,* and if taken together, they make a confused mass of cross classifications, some omitting entirely what is fundamental to others and putting first what those consider in the last place.

The question as to the discovery of an ultimate element, then, becomes unimportant philosophically. If the scientists' concepts are the result of a human reaction on nature, the limits to which discrimination and subdivision must be pushed depend upon the closeness of human contact with the kind of facts in question. When our discriminations are adequate to enable us to handle predictively all of the facts with which directly or indirectly we may come in contact, we have elements that are ultimate for that particular branch of knowledge. Scientifically, the character of the processes discovered is infinitely more important than the problem as to whether or no the entities in terms of which they are construed are ultimate. Logically, our task only ends with entities that can be construed as simple, but this simplicity never has any meaning outside of the particular point of view of the logical analysis with which we are at the time engaged.

The scientist is after all much like a map-maker, for a map must be based on an analytical knowledge of the facts of the country mapped, and must have just that kind of relation to the facts that makes its features symbols capable of aiding an engineer about to build a railroad or a general directing a campaign, but no one would expect the country to be constituted of the things found in the map, as a house is built of bricks, or that the things shown by the map had an independent existence, or that they were unrealities; yet in the case of science each of these things has been claimed as a true account of what is denoted by its concepts.

Our answer to the question raised above (p. 59) is now obvious. Atoms, electrons, and the like can not be unreal or they would not possess the value necessary to fulfil their function in a body of scientific knowledge. They are not mere symbols, nor are they independently existing elements brought together to constitute a whole of reality. They are simply phases of physical existence that have exceptional value from the fact that through centering attention on them it is possible to state some process in lawful fashion.

Perhaps the most pernicious error in philosophic thinking, and even in the thought of many scientists, is that separation of matter and energy, which while justifiable in the sense that we can distinguish the shape of an object from its color, and insist that one is not the other, is wholly illegitimate, if we try to think as if the color and the

shape are independent realities brought together in the particular object, instead of analytically derived aspects that have quite different practical values when it is a question of dealing with objects. If scientists have talked about 'energy atoms,'' it is merely because the kind of contact we have with certain phenomena makes it impossible for us to find the ''term character'' in the source from which changes spread and so the resultant energy factors constitute the sole datum, and it becomes possible to beguile ourselves with the belief that here we have a geniuine disembodied energy.

The scientists' world is the real world, but with a qualification. It is a selected real world according to those aspects which are significant for a certain purpose. Unlike the artist, whose aim is expression, the scientist can not introduce what is not really there into a certain context, but he can preserve in that context only what is fruitful for a certain purpose. He is ever under the pressure of the need of prediction. The map-maker would certainly be wrong if his map did not denote realities, but he would just as certainly be absurd if, because he charted his territory in terms of rivers, mountains, valleys, and plains, he should assert that there was nothing else of which the landscape is made up. There is no such a thing as an atom in just the sense that there is no such thing as a river, *i. e.*, they are not found out of integral relation to other realities.

Our nature determines the constitution of this scientific world merely in the sense that it determines the possibilities of our action. If there could be an organism transparent to solids, but meeting light as a barrier and consequently finding its possibilities of movement in the interior of the planets, it would undoubtedly construe the universe after the model of a Swiss cheese with movable holes, but it would be the same universe that it construed, only the ''map'' would be made from a wholly different point of view. But a being that has processes of reaction and selective attention like ours must approach any physical universe through selected phases and not meet its continuities with continuities. Given this necessity, in a variegated universe where changes spread, some concepts of matter and energy are sure to arise, where matter is the name for the resting places of analysis, and energy for quantitative correlations of spreading changes among these material ''atoms.''

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SPIRIT AND MATTER: A PHILOSOPHICAL TRADITION

IF the tendency of the day be, as some have said, an attempt to bring philosophy into closer touch with human life, one of the most characteristic methods in this general movement is the preliminary query addressed to any philosophical problem. Is problem x relevant to our present situation? is it an issue the solution of which is vital for the times? does it find root in some difficulty not yet solved in our social or economic or religious or intellectual life? Or is x merely a survival by tradition, a legacy from our fathers that can liquidate no present debt? Or again, is it a problem antiquated and strikingly barren to-day in form, but to be found relevant enough to the present if given radically different statement and interpretation?

This weapon of what looks like philosophical renovation has been turned most sharply against the problem usually mentioned in the text-books as central in the history of modern philosophy. I refer to the distinction and opposition of spirit and matter, or, more broadly, of spirituality and materiality. Taken as x, the object of the above query, this distinction in the form of an unsolved dualism is becoming discredited as being no longer more than an obstinate puzzle, based on certain premises that must be granted as preliminaries to the game. On the psychological plane, the choice between interactionism, parallelism, automatism as our epistemological theory presupposes and necessitates the preliminary acceptance of the Cartesian or the Lockeian conception of the mind; while on the metaphysical plane, the choice between materialism, idealism, or dualism as our ontological theory presupposes a distinction no less venerable. And such distinctions being no longer true to the character of our social, moral, and religious life, further thinking upon the former is work of supererogation. But a suspicion is aroused: are we condemning really the whole antithesis and its problem to the scrap-heap or do we have in mind what is only a certain phase of it?

Looking at the distinction again, I think we may feel at least two different interpretations of it, a narrower and a broader. If by mind *versus* matter we are thinking of consciousness *versus* body, we are probably right in treating this as a relic of the past, as a mere puzzle. The change to the instrumental and functional viewpoint that has recently come over psychology and its effect upon latter-day philosophic work has been convincing enough. Whether or not we go the full lengths of the "behaviorist," the tendency now is certainly in some such general direction, and "mind" is coming to refer to overt attitudes, conative at bottom, toward the object. The roots of this new position, as they run deep into the social study of men as interactions and associations of objective elements, into the ethics of human

efficiency (however else it be stated), or into the religion that preaches the blessedness of human fellowship in a heavenly enterprise on earth —these roots run too far for treatment here. But now if mind *versus* matter, spirituality *versus* materiality, be taken in the sense not of a distinction between ultimate existences, but as indicating a distinction between attitudes—put plainly, between the interest in ideals and the interest in data—then our whole antithesis has become not a puzzle, but a problem. It is not old-fashioned, but persistent, not academic, but spontaneous. And it is persistent because it is spontaneous.

The movement of thinking inevitably shows different phases, resolvable in the last analysis, I believe, into two fairly distinguishable kinds. First of all, it is obvious enough that the thinking must have some animus, something in the whole setting to start it a-going. If we adopt the old biological phrase of a "lack of equilibrium" this should be freely interpreted to include the subtlest as well as the grossest lack. More important to us than this lack, now, is the desire (tendency, conation, purpose—what you will) to be rid of the lack. But thinking isn't merely set a-going; it isn't an activity maintaining itself in a vacuum. The thinking person must act upon and with something, including the disturbing elements that irritated him into this particular thinking phase. In addition to this direct or indirect objective he must find his fulcrum, he must make use of his other materials as his data and instruments. No advance can be made until he has discovered some tools that will be instrumental in attaining the end. Finally, there must be some sort of an aim or end toward which the enterprise is directed and by which its measure of success may be ascertained. This need not be a conscious end set by the person for himself; it may be no more than the fact of a vague purposiveness evidenced in the persistence of and variation upon unsuccessful behavior and the termination of successful. (It surely need not be emphasized here that this analysis of thinking applies also to organic action or behavior in general—what difference there is is most essentially a difference only of degree.)

Of course, in a given act of thinking there may be, and usually are, other phases beside these; yet these should be sufficient to indicate the two most characteristic elements in the whole movement. There is the element of data (the characteristics and make-up of the specific problem as well as the constitution and behavior of whatever other elements may serve as instruments in reaching the solution), and there is the element of ends (the onward push that has found the obstacle an obstacle and that has urged its circumvention, as well as the gradually articulated ideal that takes form and is the final criterion of success).

To what extent the data are contributed by the extra-organic parts of the situation and to what extent the ends are contributed by the organic, are questions that need not delay us just here. That we experience every day the resistances and caprices of a somewhat alien-seeming environment and contrasted with this the hopes and ideals that spring eternal in the human breast, is of course well known. But the distinction between environment and human breast is a loose one; the resistances and caprices may not in every case be due to extra-organic sources; even the hopes and ideals are often created and nourished by an objective world that is suggestive and friendly.

The distinction of attitudes I have pointed out may be a little clearer if we hold up in comparison two of the Ancients. Democritus and his atomism, with the analysis of the familiar, but difficult wholes into the unfamiliar but easily calculated parts—this man is surely the type of the species of thinkers that ever since has been devoted to analyzing as impersonally and disinterestedly as possible the structure and behavior of the world we live in as well as of ourselves. He was interested primarily in description, in discovering the *what* characters. His contemporary, Plato, typifies well the interest in the ideal. It was not for his poetic soul to calculate what an object was composed of, but to wonder what it meant, what it was for, what end it served. And this interest in the ideal is shown the better just in that he did not inquire only after the immediate and every-day practical ends of the object concerned, but also after the higher ends that could be discerned through the object and its connections and relations to the rest of experience. A fair form was not a superlative degree of anatomical perfection, not a complex of eminently correct surface, lines, and colors, but a blessed thing which by its very nature shadowed forth something of that Beauty which remains for us ever a goal and end, never a completely adequate realization.

For the consideration of these two Greeks and their contrasted interests the corollary would not seem too bold that the philosophy of a man, school, period, or people, is colored fundamentally according as it emphasizes either of the two interests. Galileo's physics, Hobbes's psychology, Descartes's natural philosophy, all show attention to data and material. Here the interest is in learning the definite constitutions and modes of activity of the surrounding world. From the objects of more immediate use and more pressing need, the field of scientific attention has gradually widened to include the minute study of things strangely remote from bread-and-butter considerations. Everything has been standardized, codified, formulated, until the symbolic shorthand expressions for their behavior have for some assumed an appearance of deadness and meaninglessness. On the other hand, the Church Fathers, the Scholastics, Berkeley, Kant,

Fichte, Hegel—all these are more interested in the direction and portent of the data already found than in the finding of the data. The Schoolmen were primarily and almost exclusively concerned in the heavenly world as a world of future aims for present endeavor or of future standards for present behavior: heaven they acted for, earth they acted with. The other men named show how romantic tendencies are ever irrepressible. There have always been spirits pulsating with the overflow of life and with a vivid sense for movements and directions in human action and thinking. But sometimes the exaggerated individualism in the air has given the romantic thinker a strikingly ego-centric perspective, and the world is interpreted then as a part of his own purposive life; sometimes his historian's sense has led him to read his idealism in larger terms, and the world of nature becomes the physical expression of a great onward-moving Spirit or Purpose. Ever and anon we find this tendency to read nature in terms of human ends. In contrast are put often the Nineteenth Century Americans: not that they were the opposite of the "holy" in being the "wicked," but that they were the opposite of the "spiritualistic" in being the "materialistic," engrossed as they were in exploitations of their yet unfathomed natural resources and in considerations of the primary needs of the economic man.

It seems inevitable that the values found in human life get classified into either the "material" or the "spiritual." Let me take Plato again for an illustration. How far he personally was responsible and how far his historian-interpreters is unimportant now; but we may say certainly that the Platonic tradition shows an exaggerated distinction between the material and the ideal, and an hypostatization and apotheosis of the latter at the expense of the former. The purposive aspects were abstracted from the non-purposive in immediate experience and given new organization as a separate realm. The result was an ontological dualism, a world that merely *is* and a world that *ought* to be. (Now, even if we were to grant the validity of drawing the distinction this way in terms of existence, we should still want to ask, *is* there a single world that ought to be? Is it not rather a matter of manifold different details that ought to be, but not grouped into a single system and not susceptible of such grouping?)

It would seem that such a distinction in terms of existence was simply following the psychological truth that any object of great interest and attention tends to objectify itself in a more hardened and immobile form than as first conceived. Paranoia is only an extreme form of a common human tendency. If you hold fast to some all-sufficing aim, shaping all actions in the direction of its realiza-

tion, and making all else fall into that one perspective, it is not long before that ideal somehow seems able to stand alone without the pedestal that your personal life has really formed for it.

And this is true not only for private life, but for the collective thinking of social aggregates. Professor Cooley has called attention to the effect of institutionalizing private ideals. "Human-nature values, seeking realization through a complex social system, are led to take on organization and an institutional character which carries them far away from human-nature and in time calls for a reassertion of the latter." "An idea, in becoming institutional, merges itself with the whole traditional structure of society, taking the past upon its shoulders, and loses much of the breadth and spontaneity of our more immediate life."[1]

As a consequence of the natural tendency of man to generalize his occasional and incidental distinctions and then to hypostatize the resulting generalizations, we see running through the history of European thought varying conceptions of an ontological dualism. Whether we take the Stoic division of existence into the world and its pneuma, the Scholastic division of the world of the flesh and the world of the spirit, the Cartesian disparateness of thought and extension, the Kantian and Romanticist re-reading of the phenomenal world in terms of a deeper spiritual, the Hegelian and neo-Hegelian interpretation of world history as the manifestation of spirit's self-development, the tendency observable in certain quarters to-day to discount the external world in favor of "true inwardness"—in all these dualisms we may discover not uncommon starting-points. Their divergences are due to accidents of social situation, intellectual heritage or individual temperament. That they spring from much the same generic kind of personal life may be seen by careful consideration. Aside from the accidents just named, which go in to color largely the specific experience of a given individual, general characters both of crude human experience and of human reactions thereupon are discernible.

Now, what I want to point out here particularly is that universal character of experience that is best called, I suppose, by the term values, and also the universal form in which value-situations are organized.

Were it possible to make a cross-section of daily experience, taken anywhere you choose, examination of this upon the slide would reveal at once a dual nature. Any moment of life is a moment of *life* just in so far as it holds within its complex web a warp of meaning for the woof of bare fact. No bare existence *per se* really ever attained unto

[1] C. H. Cooley, "Valuation as a Social Process," *Psychological Bulletin*, Vol. IX., pp. 444, 445.

existence in any intelligible sense of the word; to be part and parcel of a world of any kind, from the most indisputable set of facts to the idlest fancy, there must be a core of active concern and indeed a face with some sort of character. We are not born into a world of indifference; whatever in it is completely indifferent is not in any sense *in* that world. The horizon of any child circumscribes only those elements that present themselves to his senses and imagination in relevant shapes, be they importunate or casual, immediate or distant, vividly exciting or refreshingly soothing. The moon, far from being an absurd 240,000 miles away and with influences upon human life of only minor importance, is an object than which nothing can be more entrancing and desirable. The pencil point between the lips may be quite lacking in nutritious capacity in the adult way of judging, but it suffices to awaken that *rapport* between life and its other that carries its own sufficient justification and only by grown-up psychologists is to be labeled a reflex action. Then, as the individual ages, as he comes into fuller shares of mankind's cumulative experience, constancies of meaning come to be established. The moon more and more definitely takes unto itself a certain aloofness, a certain unimportance, that increases in varying degrees and in varying periods; reversed substantially only in the adolescent period and thereafter lapsing again, unless given new content and meaning by being worked into a system of knowledge like astronomy which on new accounts serves to keep its reality and presence duly impressive. Experience, being a teacher, teaches one to discriminate more and more accurately and effectively. The pencil point, too, gradually is uncovered in its treachery, and if it persists as an object at all, persists as a nuisance.

Closer analysis of this natural history of man's "existential universe of discourse" reveals a continuous blooming out of each other of situations apparently dual in content, as I have brought out on preceding pages; or, if you prefer to indicate and emphasize the experiencer as an element, triangular in pattern, the angles of which represent the three factors, *agent, data,* and *end.* Any personal situation may be thus schematized.

Not only a life as a whole, but every incident in that life is given its phrasing by intent and purpose, by striving and seeking. And this general organization when analyzed betrays three separate factors. The subject of the experience, the "mind" involved, may be taken as the central agent, furnishing the ground of connection between the other two. But the central agent must have his materials, his fulcrum or lever, his more or less raw "givens," with which he is to operate and out of which he is to fashion if possible the full embodiment of the end. In the third place, the end itself must after

some fashion be envisaged, and, however schematic in outline, must serve as the goal of the remaking process. The experiencer, then, is confronted constantly by conditions of the present that call for reshaping and manipulation to accomplish a more favorable state. Daily life is a continuous story of our seeking a more satisfactory state of affairs by doing something with what we already possess.

But I fear the figure of the triangle I have suggested is not altogether apt, and the dangers into which it may lead the unwary may well be pointed out, especially since their statement serves at the same time to reemphasize important features. In the first place, there is lacking the sense of movement so essential. If the end or ideal is to function as such at all we must have a tendency or impulsion in its direction, an active desire not so much perhaps to make the ideal actual as to bring the actual to the ideal. Again, three corners of a geometrical figure are as such so spatially disposed that one is led to expect in them and their relations an immutable fixedness; whereas the interchangeability of the rôles of data and end, the capacity of a million dollars, for example, to be treated either as the immediate object of seeking or as the means for obtaining some further good, is actually fundamental not only to the character of a single cross-section of life, but to its consistent self-evolving. In the third place, the figure is likely to be inapt unless we imagine it in the very crude form of a triangular raft on rough water that often shows all three corners above the surface, but on many occasions suffers different ones to vanish from sight. Which is by way of saying that to have a genuine manifestation of purposive life the three indicated factors need not be clear and explicit. If the building of air castles, for example, is supposed to be purposeless, it is simply because the factor of ideal being exaggerated and that of present conditions suppressed, the dream gets nowhere appreciably. On the other hand, those innumerable things we do daily with conscious knowledge, but without knowing just why, exhibit recognition of the minimum of end with moderate degree of present conditions. And again, the pursuit of the end in view may become so absorbing that the relationship of the whole dynamic experience to the organic agent may be all but lost sight of; and the present conditions seem almost to be evolving to their proper goal just of themselves and without needing us to pose as their engineer.

These are the essential and characteristic factors present in the world we live and act in. When we speak of experience, we must recognize the presence and interaction, *in some sense*, first, of a set of conditions that are never quite satisfactory; secondly, of an end or ideal set of conditions in terms of which the improvement of the former is to be brought about; and thirdly, a central agent, organic

in type, whether in the form of "individual," family, club, profession, sect, race, or nation. Without any one of the three the whole is rendered meaningless.

In criticizing my own figure of the triangle above I have touched on the relativity of the distinction between data and ends, by indicating the frequent interchangeability of their rôles. A further point may be added in this connection to the effect that the relativity of the distinction would and does argue for a basis in common. In fact, this is the bond of relation between them; it is the bond of import or leading, which is espied or felt in some particular details or some general aspects of the given and which suggest in some more or less forceful way the possibilities that go in to constitute the ideal now outlined. Those environmental details that possess the pregnant character of suggestiveness come naturally to claim the focus of attention; and the other details are content either to announce themselves as in or out of harmony with the suggested plan (*i. e.*, as helpful materials or as hindrances) or to hide their unimportance by dropping out of sight and consideration.

Thus we may say that among the dynamic and vacillating details and their interrelations that constitute the wealth of an immediately or naïvely experienced environment, there are to be discerned many features that are weighty with human significance, while the others are (comparatively) dead, cold, hard.

And now we are back again at the beginning of this paper! To the discriminating mind—and every mind is in very nature discriminative—the content of life yields something of a double character, the spiritual and the material. In so far as we stress the elements of value and purpose, of ideal and end, we are emphasizing the *spiritual* phases; but when we limit consideration more strictly to the less attractive and exciting, but more calculable and tractable, we are attending to the *material* phases. To put it again in terms of attitude, we have here distinguished the interest in *ideals* (or the standards and guides to our endeavors) and the interest in *data* (the starting points and the raw materials of our efforts). Plato and Democritus I have used as examples of the two emphases.

If, perchance, any readers regard some of the foregoing as a fable, let me then at least recommend its moral. The well-known tendency of human thinking to petrify its objects is nowhere shown more clearly or sadly than here. In the fields of religion particularly we may often witness the emotion-impelled thinker piecing together the spiritual aspects of life as they are naturally manifested on occasions, to form a coherent one-piece structure. The relative, changeable, fluid, dynamic values of life are torn from their normal connections and ascribed an absolute, stable, static character. And bad as this

appears to intellect and theory, it is especially unfortunate for practise. When extracted from their natural setting these spiritual phases of experience are deprived of their proper functions; or better, when hot enthusiasm and incidental imagery have fashioned out an independent realm of the Spirit, there is an inevitable backward discrediting of the more prosaic, but less fictitious values in every-day living.

Instead of keeping ourselves attentive and ready to work out and appreciate to the full all the suggestions of a better living that run through daily experience, we find ourselves committed to an ontological dualism. The need, then, hardly calls for restatement; it is not so much for an injection of a foreign spiritual something into the material, nor a justification of this immediate world by contorting it into line with an other-world perspective, but a rediscovery of the beautifuls and goods and desirables within the present, given existence. And this is only to rediscover what was always felt, but what has been so frequently symbolized and resymbolized that form has hidden gist, that imaginative and poetic incrustations have hidden the original living essence. Thinking man with his playful fancy and his ponderous intellect needs constantly to keep alive a sense for the vital in his values.

And now in a nutshell: The traditional problem of spirit *versus* matter may be given vitality by being taken in a larger sense as the spiritual *versus* the material, for this distinction is found rooted in a natural, but relative distinction within the growth of any human experience, whether taken in terms of interplay of thinking processes or of the interrelations of experienced content. It is the distinction between the data of immediate and imperfect environments and the ends of remote and desirable conditions yet to be effected. How it easily becomes exaggerated is shown in the history of philosophy and even to-day in many philosophic and religious conceptions. To be vital, however, the category of the "spiritual" must be kept elastic and applicable directly to the absorbing, but changing values of purposive living.

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SOCIETIES

NEW YORK BRANCH OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

THE New York Branch of the American Psychological Association met in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences, on November 27,

at Columbia University. Following are abstracts of the papers presented:

Echolalia in Idiots: Its Meaning for Modern Theories of Imitation. DR. L. S. HOLLINGWORTH.

Echolalia (which is a curious tendency, found in aments and in certain insane patients, to echo or repeat whatever is said to them or in their hearing) has occasionally been described in the literature of pathological psychology, notably by Barr. The present paper describes three cases of echolalia in idiots, one case being a child of five years, the second, a child of eleven years, and the third, a man of about thirty years. These patients showed a marked ability and tendency to repeat automatically whatever was said to them, revealing no understanding of the question-response situation. Instead of replying to questions, they simply repeated them mechanically.

Such cases are of great interest in connection with modern controversies about the nature of imitation in man. Professor Thorndike has recently called into question former ideas about imitation, and has debated the propriety of its inclusion, as a general tendency, among the instinctive tendencies of man. Professor Montague has made persuasive objection to Professor Thorndike's discussion and final conclusion, holding that the potency of behavior to produce similar behavior in witnessing human beings, can not be satisfactorily explained on the ground of a few specific inherited tendencies plus the laws of habit formation in general.

Does the behavior of our three idiots furnish any new light to the controversy? It would be desirable to have much more information about the development and the modifiability of the echolalia which they showed. However, it is very difficult to see how their tendency to duplicate behavior experienced is to be explained except on the basis of instinctive imitation. The patients were idiots, incapable of adapting themselves independently to even very simple situations, or of understanding the significance of what was said to them. Their "echoing" would seem to be inexplicable by the laws of habit formation in general, or on the basis of any specific inherited tendencies. If we explain the behavior of such patients as due to an instinctive tendency to imitate, shall we assume that they suffer from some characteristic lesion which sets them apart as a separate species? Or does their reaction indicate the presence of an instinct which is an element in the original nature of man, and is distributed according to the curve of probability? (To appear in full in the *Journal of Educational Psychology*, May, 1917.)

Shrinking of Images. DR. G. C. MYERS.

Eight graduate students of Columbia University, under certain

standardized conditions, cut threads which represented one of two dimensions of some familiar object voluntarily selected which could not be seen during the experiment. These threads were placed between the pages of a magazine where the date and introspections were recorded. One subject first imaged tactually then visually; the rest, as a rule, imaged visually. Some imaged once a day, some twice, and some three times until they each had about fifty records. Later these threads were measured in millimeters by the writer.

Four other subjects thus imaged ten familiar objects successively for six continuous hours, of whom two selected later an arbitrary thread length and repeatedly cut threads for one hour to equal the memory length of that thread. Five more did the same for one half hour. Twelve subjects for one hour each also imaged an object which had been presented before the experiment began. Its dimensions were 228–44 mm. Those dimensions which were voluntarily selected ranged from 34 inches to about one inch.

Curves were presented of individuals, and of the group of twelve. Although there were considerable individual differences there were no exceptions to the rule that the general trend of the curve was downward. Most resembled the learning curve. The curves for length and width were remarkably parallel. The size of the objects imaged as a rule were greatly underestimated. This was only a preliminary report.

A Comparison of the Binet-Simon Tests of Intelligence and the Squire Graded Mental Tests. DR. J. C. BELL.

The Binet tests have been criticized because of the trivial nature of some of the tests, the arrangement of the tests, and the principle of mental age. The Squire tests were constructed with greater regard to psychological analysis, but have been used as a graded series only by Squires herself. It was proposed to investigate the relative values of the two series of tests for school purposes. Both were given to twenty-three elementary pupils in grades four to seven, inclusive, three from each half grade except the high seventh, where only two were available. No retarded pupils were included. By the Binet tests the mental age of the pupils ranged from one year below their chronological to four years above. To reduce the results of the Squire tests to a single expression for each pupil, the highest score in each test was placed equal to 100, the lowest equal to 0, and the other scores were reduced to corresponding values. The results for each individual in the eighteen tests were then averaged for a final score. The Pearson coefficient of correlation between these scores and the Binet mental ages was .70. The Binet tests were found superior because they could be given in one fourth the time required

for the Squire tests, because the interest of the pupils was maintaind at a higher pitch, and because the results were more easily interpreted.

Psychological Analogy in Political Theory. DR. J. P. TURNER.

(The reading of this paper has been postponed until the February meeting.)

A. T. POFFENBERGER, JR.,
Secretary-Treasurer.

COLUMBIA UNIVERSITY.

REVIEWS AND ABSTRACTS OF LITERATURE

Fortschritte der Psychologie und ihrer Anwendungen. Herausgegeben von DR. KARL MARBE unter Mitwirkung von DR. WILHELM PETERS. Vols. II.–III., Hft. III. Pp. 371, 184.

In these numbers of the *Fortschritte* we may notice a few of the more important communications. In Volume II, pages 1–133, Stoll presents an elaborate analysis of the errors in writing. Twenty-seven members of a seminary copied texts for an hour and seven minutes, and the results furnished the material upon which the study is based. In general it was found that the sources of error were due to the relative frequency of the words, to inhibition of the Ranschburg type, *i. e.*, inhibition of similar sounds and meanings, to perseveration of words or parts that had been written or that were to come, and upon the introduction of associated ideas. The relative frequency of each of these causes follows the order named above. Inhibition accounts for most of the omissions; the replacement of a more usual for a less usual word for the substitutions; and perseveration for the greatest number of additions. It is a careful and suggestive piece of work.

In Heft II. of the same volume, Pick cites three pathological conditions that bear upon psychological problems. One gives an account of two women who showed what he called negative abstraction, failure to observe and to recall all but a single element in any object, in this instance its glitter or sheen. A second he interprets as showing that the impersonal sentence really has a subject in some conjectural force or capacity from the fact that certain patients always used it to describe their acts when they did not themselves feel responsible for them. They referred them to some force active within themselves. In a third he traces instances of plagiarism in certain pathological states to a failure of recognition of the material that is recalled.

Von Frey in the same number gives a summary of the present

status of cutaneous sensation that serves admirably to bring together scattered work. Peters and Němeček report a study of the influence of affective tone upon recall. In general they found that seventy to eighty per cent. of the experiences recalled had an affective tone at the time of the event. A slightly greater number of pleasant than of unpleasant experiences are recalled, and in the recall there is a tendency for the unpleasant experiences to take a pleasant character or to lose affective tone. Evidently memory has an optimistic trend.

Heft V. contains two articles: One by Prandtl reports a series of experiments in selecting the important geometrical elements in pictures. In the midst of variation there seems to be agreement among the observers as to what the prominent forms are. It is argued that the method offers a means for determining the formal elements in art. Marbe in a second article gives a full description and history of the psychological laboratory at Würzburg.

In Heft VI., Hacker reports the results of injecting antikenotoxin upon the capacity to work. It was hoped that it might lessen the effects of fatigue, but the results were largely negative. Caffein increased the capacity in practically every case, but antikenotoxin was without influence.

Vol. III. begins with an article by Marbe defending the results of his early investigation of judgment and showing its relation to the imageless thought controversy that has followed it. He claims precedence over the Würzburg school and Binet in appreciating these elements, but asserts that they have long been recognized in psychological discussions, that the new discovery will not work the revolution that has frequently been prophesied for it, and that even if the association psychology must be modified in the light of the recent results, it is not yet time to discard the older laws altogether.

In Heft III., Römer reports results of association tests of backward children. The only difference in the associations that correlated with the intelligence was a gradual increase in the percentage of common associates with mental age. The more retarded or lower cases merely repeated the word or gave words with similar sounds or completed words or phrases. The author suggests that the number of common or preferred associates might be used as an indication of the intelligence.

In Heft III., Sommer reports observations upon the methods used in training the Elberfeld horses. He observed for a day (two lessons) the procedure employed by Herr Krall in establishing the simple associations in an untrained horse. Sommer is of the opinion that the results depend upon the slow establishment of simple associations between the symbols and sounds and the movements that are employed for expression. The process is similar to one used by

Sommer in the training of defective children and he believes that all of the results, even the extraction of roots, can be understood in that light.

It is evident from these selected articles that the Fortschritte continues its early high standard in the quality and variety of articles that it presents and must be assigned an important place among current psychological publications.

W. B. PILLSBURY.

UNIVERSITY OF MICHIGAN.

Bodily Changes in Pain, Hunger, Fear, and Rage. An Account of Recent Researches into the Function of Emotional Excitement. WALTER B. CANNON. New York and London: D. Appleton and Company. 1915. Pp. xiii + 311.

The results of Professor Cannon's investigations are already familiar to the readers of this JOURNAL. Previous experimenters had shown that fear, anger, and pain inhibit the flow of gastric juice and saliva; Cannon found that stomach contractions were also inhibited by these experiences. He and his pupils have demonstrated that such excitements increase the discharge of adrenin into the blood, and have confirmed the suggestion derived from other investigators that emotional excitement increases the amount of blood sugar. They have shown that in pain and emotional excitement innervation of the sympathetic nervous system, "probably aided by the adrenal secretion simultaneously liberated," affects the blood pressure in such a way that the blood is driven out of "the vegetative organs of the interior, which serve the routine needs of the body, into the skeletal muscles which have to meet by extra action the urgent demands of struggle or escape," and the heart, lungs, and brain whose activity must also be increased. They have experimentally demonstrated that adrenin counteracts the results of muscular fatigue by an influence not wholly derived from its effect on blood pressure, and have shown that it produces faster coagulation of the blood, an assertion previously disputed. The general conclusion which is obviously indicated is that emotional excitement serves a purpose of great usefulness to the organism. Sugar, the fuel needed for intense bodily exertion, is automatically poured into the blood; the supply of blood is sent by the change in blood pressure where it is most needed; muscular fatigue is counteracted and the danger of bleeding to death from wounds lessened by the action of adrenin on coagulation.

The chapter on hunger is a less essential part of the main argument of the book. It reports an experimental proof of the fact that the sensation of hunger is occasioned by the contractions of the empty stomach.

While the demonstration that the physiological effects of pain, fear, and rage are of great service to the organism in times of supreme stress is of deep scientific interest, its immediate appeal is to the physiologist and biologist. More directly the concern of the psychologist is the chapter on "The Interrelations of Emotions." The author points out that the opposition between the functions of the middle or sympathetic division of the autonomic nervous system and the two distal divisions, the cranial and the sacral, is reflected in an antagonism between the emotional experiences expressed through these divisions. "The cranial autonomic—is concerned with the quiet service of building up reserves and fortifying the body against times of stress. Accompanying these functions are the relatively mild pleasures of sight and taste and smell of food. The possibility of existence of these gentle delights of eating and drinking and also of their physiological consequences is instantly abolished in the presence of emotions which activate the sympathetic division" (p. 268). In like manner the sexual emotions, depending on the sacral division, are abolished by pain, fear, or rage.

The author concludes from the similarity of the visceral effects of rage and fear that visceral influences are too undifferentiated to account for differences in the felt quality of emotions; and adds this consideration to Sherrington's observation that dogs with the visceral influences eliminated showed characteristic facial and vocal evidences of different emotions, as proving the relative unimportance of the visceral factors for the psychology of emotion. It should be carefully noted that this does not in the least mean an overthrow of the James-Lange theory of emotion. According to James and Lange, the emotion is caused by motor phenomena occurring not only in the viscera, but in the skeletal muscles as well. It may well be urged that in so far as the visceral disturbances get the leading rôle in very violent emotion and are uniform for different kinds of emotion, just so far do the different kinds come to feel alike and really to be the same emotion. As for Sherrington's dogs, rage in a normal dog, it may be argued, consists in the sensations from visceral changes, from facial expression, and from barking; if the visceral changes are prevented from occurring, the fact that the other motor effects persist does not prove that the dog's subjective state is just what it would normally be. To assume that because the dog can still bark, the subjective condition of rage is present unaffected by the loss of visceral influences is to assume, not to prove, the very point which the James-Lange theory would deny, namely, that a motor process like barking is merely an effect of a preexistent subjective state of emotion, instead of being one of the causes of the state.

MARGARET FLOY WASHBURN.

VASSAR COLLEGE.

Il Nuovo realismo in Inghilterra e in America. A. ALIOTTA. Prato: "La Tipografica." 1915. Pp. 114.

This small volume is a very interesting; and, in many respects, a valuable contribution to contemporary philosophical literature. It deals with American new realism, which it studies in its sources and in its doctrines, showing, with unusual acumen, its merits and its shortcomings.

The book is divided into three parts. The first part deals with the forerunners of the new realism, especially with Moore and Russell, whose doctrines are accurately exposed in all their forms and ably criticized. In the second part, we are directly introduced to the American new realists. The author does not limit himself to giving an account of their philosophy. He shows their place in the history of modern thought, and contrasts their doctrine with that of the neighboring schools. We learn from his book what the realist owes to the idealist. We realize that modern thought has been modified by the idealistic current to such an extent as to compel the new realists to differ from the ancients in many essential points. Here, also, the author touches upon pragmatism, and shows how it agrees with realism in many respects, differing from it in this essential characteristic that, for the realist, consciousness, although active, does not in any way alter reality.

Not less interesting is the third part of the book, in which the author gives his own criticism of the realistic philosophy. His strongest objection seems to be the excessive pluralism to which realism condemns itself, having rejected all principles of unity, and thereby made impossible any explanation of the genesis of our experience. It may be doubted, says the author, whether the universe is one single system; but no realist can deny that partial systems exist, although their existence is for him a mystery.

In point of fact, the author sees three mysteries in the new American realism: how consciousness can arise from the chaos of external reality; how the unity of the subject can arise from the plurality of phenomena; how an activity can be conceived, which does not alter reality (p. 105).

A fairly complete bibliography of the new realism is appended to the volume, and makes it a useful book of reference.

J. L. PERRIER.

NEW YORK CITY.

JOURNALS AND NEW BOOKS

JOURNAL OF EXPERIMENTAL PSYCHOLOGY. October, 1916. *The Existence and Function of Inner Speech in Thought*

Processes (pp. 365–392): H. B. REED.—The purpose of the investigation was to discover the functions of inner speech in the thought processes, particularly in the apprehension of meaning. The conclusions were: inner speech is not a universal, but an individual trait; inner speech has no important function in comprehension in reading, and in writing, or in the rate of reading and writing. *The Mnemonic Span for Visual and Auditory Digits* (pp. 393–402): ARTHUR I. GATES.—Coefficient of correlation of visual and auditory forms of tests was .625, when the span was taken as basis of comparison, and .225 when the exposure series surpassed the span. The average span for college students was approximately 8.2 digits when the visual methods of presentation was employed, and 7.7 digits with the auditory method. Increasing the number of digits exposed beyond the span decreased the number of digits that can be recalled, this decrease was greater when the auditory method of presentation was used than when the visual method was employed. *The Correlations between Different Memories* (pp. 403–418): FAYE BENNETT.—The purpose of the investigation was to determine the correlation between immediate and mediate retention for auditory and visual presentation with various sorts of material. Nouns presented visually for mediate learning show the highest of the correlations with other memory functions tested. There is a high correlation between mediate and immediate retention of sufficient number and variety of measurements for each type of memory taken. *The Effect on Foveal Vision of Bright Surroundings,* III. (pp. 419–425): PERCY W. COBB.—Previous reports gave results relating to the brightness-difference threshold which lacked in definiteness. The reason was due in part to the form of apparatus used to furnish the test-stimuli. This paper describes a modification of the apparatus used by which those defects were overcome. *On Color Induction with Reference to Color Recognition* (pp. 426–453): MARY ALMACK and G. F. ARPS.—When the after-effect of a primary stimulus is similar to the color of the disc the limen is the lowest of the five limens for this color. When the primary stimulations are not complementary to the secondary stimulations the influence of the effects of primary stimulus upon the recognitive limens of the secondary stimuli is more difficult to trace. *Apparatus and Experiments for the Introductory Course* (pp. 454–459): HOWARD C. WARREN and PRENTICE REEVES.—A description with illustrations is given of (1) a combined tilting board and rotation table and of (2) a size-weight illusion experiment.

De Amicis, Edmondo. My Last Friend Dog Dick. Tr. by J. G. Lista. Boston: The Alpine Press. 1916. Pp. 35.

Evans, John E. The Effect of Distraction on Reaction Time with Special Reference to Practise and the Transfer of Training.

Archives of Psychology, No. 37. Edited by R. S. Woodworth. New York: The Science Press. 1916. Pp. iii + 106.

Frank, Henry. Psychic Phenomena: Science and Immortality. Boston: Sherman, French, and Company. 1916. Pp. 556. $2.50.

Freud, Sigmund. The History of the Psychoanalytic Movement. Nervous and Mental Disease Monograph Series, No. 25. New York: Nervous and Mental Disease Publishing Company. 1916. Pp. iii + 58.

Leuba, James H. The Belief in God and Immortality: A Psychological, Anthropological and Statistical Study. Boston: Sherman, French, and Company. 1916. Pp. xvii + 340. $2.00.

Le Bon, Gustave. The Psychology of the Great War. Tr. by E. Andrews. New York: The Macmillan Company. 1916. Pp. 480. $3.00.

NOTES AND NEWS

A MEETING of the Aristotelian Society was held on Monday, December 4, 1916, Dr. H. Wildon Carr, president, in the chair. A paper was read by Dr. Bernard Bosanquet on "The Function of the State in promoting the Unity of Mankind." Dr. Bosanquet said, that the essence of the Greek and German theory of the state has been much mistaken by recent critics, although it has been rightly explained by English thinkers (*e. g.*, Green and Lord Haldane, in the Montreal address).

1. The so-called absolutism of the state is merely a caricature of the unique relation between a man and the community with which his will is united, especially in so far as it provides an adjustment of all practical relations.

2 and 3. Speaking of "States" instead of "the State" has soon revenged itself; all the critics speak of states in terms of those defects which it is their inborn function to abolish.

4. Essentially, according to the theory, as having the same task in different territories, states are cooperative. War, as Plato showed, is rooted in their disease. Their function is the organization of rights.

5. The State, then, is a moral being with a conscience, and when its conscience is perverted, will fight for the wrong as its right. But it is a poor way of ensuring peace to deny its conscience under the name of "absolutism" instead of trying to provide for its enlightenment. Yet this is the critics' line.

6 and 7. It is true that the moral position of the state is not comparable to that of a private person, and this view is described as absolutism from unintelligence of what constitutes a moral situation and duty.

8. As to wider loyalties and units than that of the nation-state. There *is* no being like the Comtists' "humanity," and humanity as a quality belongs chiefly to exceptional communities.

9. Wider communities than the nation-state may be possible; but only if they fulfil the same condition of unity, *viz.*, a general will. Without this, all leagues, federations, *etc.*, are mere force and dangerous, and with it, hardly necessary. The true outlook for peace is to the removal of causes of discontent by organization at home; especially by freedom of human intercourse and absence of privilege. World-wide human relations are no reason for world-wide political units. A system of states each well organized at home might be just as peaceful and much more valuable, compared with a world-state. To doubt this is to harbor the barbarous suspicion which is a cause of war.

The idea of a political community of humanity incapable of war, is mixed up with millennial superstitions, and withdraws our thoughts from the true line. This is, not to disparage the state, but to see that it completes its work of organization, by which the seeds of war are killed.

In the discussion which followed Mr. Bertrand Russell maintained that the state was not an end in itself, and as an institution did not promote the highest ends. For example, anything touching religion has to be individual in order to be sincere. The essence of the State is a certain limitation of freedom, and the best people in the community ought not to be controlled by the State. Lord Haldane contended that the State must reform itself from within, and that State reform could not be looked for from federations without. Professor J. A. Smith defined the State as the only form of human association which expresses a general will of its members. It was the peculiarity of the State to provide the conditions of the best life, not the best life itself. Professor J. S. Mackenzie criticized the term "general will." He would prefer to speak of a general system of valuation.

Dr. Roswell Angier, assistant professor of psychology at Yale University, will, during the second half year, give at Yale University one of the courses given by the late Hugo Münsterberg. The other courses will be given by Assistant Professor H. S. Langfeld and Dr. L. T. Troland.

At the University of Washington, Dr. Leonard V. Koos has been made associate professor of education, and Dr. Clifford Woody has been appointed assistant professor in the same department.

Mr. B. F. Pittenger, who was appointed associate in education at the University of Illinois for the current year, has accepted a position as adjunct professor of education in the University of Texas.